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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/485,017	04/06/2000	YUICHI NAKAO	65296	1390

23872 7590 04/23/2003

MCGLEW & TUTTLE, PC  
SCARBOROUGH STATION  
SCARBOROUGH, NY 10510

EXAMINER
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DICKENS, CHARLENE

ART UNIT	PAPER NUMBER
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2855

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

107

**Office Action Summary**

Application No.

09/485,017

Applicant(s)

NAKAO ET AL.

Examiner

Ex. Dickens

Art Unit

2855

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 February 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Applicants' Admitted Prior Art (APA). The APA teaches a Coriolis mass flow meter comprising: two parallel flow tubes(1, 2)of a curved tube type having base plates (27, 28) fixedly fitted to them at the points serving as vibration fulcrums (page 2, lines 22, 23 of instant application); a drive unit 15 disposed at the central part of said flow tubes for causing any one of said flow tubes to resonate with the other tube in a phase opposite to each other; a pair of vibration sensors (16, 17) disposed at symmetrical positions with respect to the mounting position of said drive unit for sensing a phase difference proportional to Coriolis force; said drive unit and a pair of said vibration sensors each being formed by a coil and a magnet (page 3, lines 14, 15 of instant application); said drive unit coil is fitted to any one of said flow tubes and said drive unit magnet is fitted to the other of said flow tubes, and magnets of said vibration sensors are fitted to said any one of said flow tubes and coils of said vibration sensors are fitted to the other flow tube (page 2, lines 20-22 of instant application).

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-3, 6, 8, 11-15, & 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over The Admitted Prior Art (APA) in view of US Patent Re 36,376 ('376). The APA discloses a Coriolis mass flow meter comprising: two parallel curved flow tubes having base plates (27, 28) fixedly fitted to them at the points serving as first vibration fulcrums; a drive unit 15 for causing any one of said flow tubes to resonate with the other flow tube in an opposite phase with each other; a pair of vibration sensors (16, 17), disposed at symmetrical positions with respect to the mounting position of said drive unit, for sensing a phase difference proportional to Coriolis force; and a meter body 34, containing a second fulcrum, holds connecting ports at both ends and the entire flow meter. However, the APA does not disclose an inlet-side manifold branching from an inlet of a fluid being measured to two flow tubes; an outlet side manifold for joining fluid flows flowing in the two flow tubes to discharge from a fluid outlet and a meter body is mechanically

connected to the inlet-side and outlet-side manifolds only at the inlet-side of the inlet-side manifold and at the outlet side of the outlet side manifold, respectively, so that the joint parts between the inlet-side and outlet-side manifolds and the flow tubes that serve as second vibration fulcrums, can be isolated from the meter body and all structures connected thereto, as recited in claims 1, 11 of instant application. '376 discloses an inlet-side manifold 130 branching from an inlet of a fluid being measured to two flow tubes 112; an outlet side manifold 130 for joining fluid flows flowing in the two flow tubes to discharge from a fluid outlet and a meter body (Fig. 1) is mechanically connected to the inlet-side and outlet-side manifolds only at the inlet-side of the inlet-side manifold and at the outlet side of the outlet side manifold, respectively, so that the joint parts between the inlet-side and outlet-side manifolds and the flow tubes that serve as second vibration fulcrums, can be isolated from the meter body and all structures connected thereto for the purpose of providing an optimized Coriolis mass flow meter which has improved stability to excitations caused by external influences (Abstract). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have an inlet-side manifold branching from an inlet of a fluid being measured to two flow tubes; an outlet side manifold for joining fluid flows flowing in

the two flow tubes to discharge from a fluid outlet and a meter body is mechanically connected to the inlet-side and outlet-side manifolds only at the inlet-side of the inlet-side manifold and at the outlet side of the outlet side manifold, respectively, so that the joint parts between the inlet-side and outlet-side manifolds and the flow tubes that serve as second vibration fulcrums, can be isolated from the meter body and all structures connected thereto in the APA as taught by '376 for the purpose of providing an optimized Coriolis mass flow meter which has improved stability to excitations caused by external influences. Claim 6: the modified APA discloses a Coriolis mass flow meter wherein said drive unit and said vibration sensors are disposed between said two flow tubes in such a manner as to be aligned with the central axes of said two flow tubes (Fig. 10 of instant application).

Claims 8, 17: the modified APA discloses Coriolis mass flow meter wherein said vibration sensors are disposed at nodes of the secondary vibration mode at the proximal parts each on the inlet and outlet sides that serve as vibration beams (page 3, lines 12, 13 of instant application).

Claim 12: the modified APA discloses a meter wherein said drive unit vibrates said first and second flow tubes toward and away from each other (page 3, lines 17, 18 of instant application).

Claim 13: the modified APA discloses a meter wherein said meter

body is spaced from said first and second ports of said inlet and outlet manifold (Fig. 1 of '376).

Claim 14: the modified APA discloses a meter wherein said first and second ports of said inlet manifold are spaced from each other; said first and second ports of said outlet manifold are spaced from each other (Fig. 1 of '376).

Claim 15: the modified APA discloses a meter wherein said drive unit includes a magnet connected to said first flow tube and includes a coil connected to said second flow tube; each of said sensors include a magnet connected to said second flow tube and include a coil connected to said first flow tube (page 3, lines 20-22 of instant application).

Claims 18, 19: the modified APA discloses a meter wherein said inlet and outlet manifolds have a shape to preclude the manifolds from having a particular natural frequency (page 3, lines 12, 13 of instant application) and said inlet and outlet manifolds have a continuously increasing shape without a particular natural frequency.

5. Claims 2 and 3 rejected under 35 U.S.C. 103(a) as being unpatentable over the modified APA as applied to claim 1 above, and further in view of US Patent 5,297,426 ('426). Claims differ from the modified APA with the recitation of a Coriolis mass flow meter wherein a flow path of said inlet side manifold is smoothly curved from the inlet thereof, branching into two flow tubes

while continuously reducing the total cross-sectional area of flow paths of said two flow tubes; and flow paths of said outlet-side manifold are smoothly curved from the joint parts thereof with said flow tubes, joining said flow paths while continuously increasing the total cross-sectional area of said flow paths, and leading to a fluid outlet and wherein said inlet-side and outlet-side manifolds are formed into curved blocks whose cross-sectional areas continuously increase toward said joint parts with said flow tubes from said fluid inlet or said fluid outlet. '426 discloses a Coriolis mass flow meter wherein a flow path of said inlet side manifold is smoothly curved from the inlet thereof, branching into two flow tubes while continuously reducing the total cross-sectional area of flow paths of said two flow tubes; and flow paths of said outlet-side manifold are smoothly curved from the joint parts thereof with said flow tubes, joining said flow paths while continuously increasing the total cross-sectional area of said flow paths, and leading to a fluid outlet and wherein said inlet-side and outlet-side manifolds are formed into curved blocks whose cross-sectional areas continuously increase toward said joint parts with said flow tubes from said fluid inlet or said fluid outlet (Figs. 5, 8, 10) for the purpose of providing a fluid measuring device which has a main line that is capable of directing fluid flow from an inlet to an outlet (col. 1, lines



66-68). It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a Coriolis mass flow meter wherein a flow path of said inlet side manifold is smoothly curved from the inlet thereof, branching into two flow tubes while continuously reducing the total cross-sectional area of flow paths of said two flow tubes; and flow paths of said outlet-side manifold are smoothly curved from the joint parts thereof with said flow tubes, joining said flow paths while continuously increasing the total cross-sectional area of said flow paths, and leading to a fluid outlet and wherein said inlet-side and outlet-side manifolds are formed into curved blocks whose cross-sectional areas continuously increase toward said joint parts with said flow tubes from said fluid inlet or said fluid outlet in the modified APA as suggested by '426 for the purpose of providing a fluid measuring device which has a main line that is capable of directing fluid flow from an inlet to an outlet.

6. Claims 4 and 5 rejected under 35 U.S.C. 103(a) as being unpatentable over the modified APA as applied to claim 1 above, and further in view of US Patent 4, 955, 239 ('239). Claims differ from the modified APA with the recitation of a Coriolis mass flow meter wherein a meter body has a U-shaped cross section and a box construction having at the upper part thereof a base plate to prevent said meter body from interfering with said

vibration fulcrums. '239 discloses a meter body has a U-shaped cross section and a box construction having at the upper part thereof a base plate (Figs. 1,4) for the purpose of providing a vibrating structure wherein the method for mounting wires between vibrating structures are not compromised so as to prevent wire breaking (col. 2, lines 50-53). It would have been obvious to one having ordinary skill in the art at the time the invention was made to a meter body has a U-shaped cross section and a box construction having at the upper part thereof a base plate in the modified APA as taught by '239 for the purpose providing a vibrating structure wherein the method for mounting wires between vibrating structures are not compromised so as to prevent wire breaking.


7. Claims 7, 10 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over the modified APA, as applied to claims 1, 9, 11, and 15 above, and further in view of JP 9250940. Claims differ from the APA, as modified, with the recitation of a flexible printed circuit board bent symmetrically. JP 9250940 discloses the use of a flexible printed circuit board 9 bent symmetrically for the purpose of providing a Coriolis flow meter wherein vibration attenuation of a vibrating tube by wiring is lessened and connection of the wiring is held stable for a long period. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have included in


the APA, as modified, a flexible printed circuit board bent symmetrically as suggested by JP 9250940 for the purpose of providing a Coriolis flow meter wherein vibration attenuation of a vibrating tube by wiring is lessened and connection of the wiring is held stable for a long period.

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Both US Patents 4,895,031 and 5,349,872 disclose Coriolis flow meters.

9. Applicants arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Dickens or the supervisor, Eddie Leftkowitz, whose telephone numbers are (703) 305-7047 or (703) 305-4816, respectively. The fax numbers are (703) 305-3431 and (703) 305-3432.

  
cd/dickens  
April 12, 2003

  
EDWARD LEFKOWITZ  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800